UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/713,898	10/18/2002	David C. Schwartz	960296.99047	4216

26734 7590 10/15/2010

QUARLES & BRADY LLP
33 E. MAIN ST, SUITE 900
P.O. BOX 2113
MADISON, WI 53701-2113

EXAMINER	
MUMMERT, STEPHANIE KANE	
ART UNIT	PAPER NUMBER
1637	

NOTIFICATION DATE	DELIVERY MODE
10/15/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

pat-dept@quarles.com

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/713,898
Filing Date: October 18, 2002
Appellant(s): SCHWARTZ ET AL.

Julia vom Wege
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed May 21, 2010 appealing from the Office action mailed December 2, 2009.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 22 and 25 have been canceled. Claims 1-20 and 28-33 have been withdrawn from consideration. Claims 21, 23, 24, 26 and 27 are pending and have been rejected.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN

REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

Perkins et al. (Science, 1995, 268(5207):83-87)

Kaiser et al. (Journal of Molecular Biology, 1963, vol. 6, p. 141-7)

Bensimon et al. US Patent 6,265,153 07-2001

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Previous Rejections

Claim Interpretation

The term 'microchannel' is being given the broadest reasonable interpretation in light of the specification. The term is not explicitly defined in the specification and the term is instead described in general terms and includes preferred embodiments. For example, the specification notes "the present invention fixes and straightens polymeric molecules using a channel sized to provide laminar flow of a liquid along a channel length, the channel having at least a first wall providing electrostatic attraction to the polymeric molecule" (paragraph 13 of PgPub). The specification also teaches "the channel may include a region of varying cross-section to promote a gradient in the laminar flow rate" (paragraph 29 of PgPub). Finally, regarding more specific

dimensions, the specification notes "in one embodiment, the cross-sectional width of the micro-channel is 50 micrometers and is preferably less than 100 micrometers. More generally, it is believed that the width will be between one and one hundred times the straightened length 40 of the polymeric molecule" (paragraph 51 of PgPub). While this portion of the specification suggests specific size of the microchannel, this teaching does not reach to the level of a specific definition of the size at which a channel of the invention is a microchannel. Therefore, as the term has no specific size limitations associated with it, the term is being given the broadest reasonable interpretation and is being interpreted as reading on application of the method to a 'channel' of any size.

Regarding the term 'wall', the term is not given a specific definition and therefore is being given the broadest reasonable interpretation in light of the specification and is being interpreted as reading on DNA affixed or attached to any surface, including a rounded particle or bead.

Priority

The later-filed application must be an application for a patent for an invention which is also disclosed in the prior application (the parent or original nonprovisional application or provisional application). The disclosure of the invention in the parent application and in the later-filed application must be sufficient to comply with the requirements of the first paragraph of 35 U.S.C. 112. See *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ2d 1077 (Fed. Cir. 1994).

The disclosure of the prior-filed application, Application No. 09/962802 (US Patent 6610256), 08/855410 (US Patent 6294136) and 08/415710 (US Patent 5720928), fails to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. 112 for one or more claims of this application. Each of these patent disclosures and claims are directed to practice of the method on a planar surface and do not disclose of otherwise provide support for the practice of the method in channel or microchannel formats as claimed in the instant specification. The only mention of channels or microchannels present in these prior filed applications is the use of a microchannel plate reader, a disclosure which does not support the method of straightening or fixing within a channel. While Applicant's mention of a laminar flowing chamber is noted, the specification of the priority documents specifically states "the laminar flow chamber should contain a thin space, for example, a space generated via 10-20 micron opening." This teaching is not the same as the micro-channel claimed. An opening with a "thin space" encompasses a narrow entry into a chamber with dimensions that widen to a size much larger than microns in dimension. Therefore, this teaching in the priority documents is not interpreted as sufficient to support a micro-channel.

Furthermore, it is also noted that the instant claims also require a step of "detaching the first wall from the micro-channel". This limitation is also lacking proper enabling support in the priority documents. Therefore, the claims are being afforded the priority date of the instant application, October 18, 2002.

Previous Grounds of Rejection

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 21, 23-24 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perkins et al. (Science, 1995, 268(5207):83-87) in view of Bensimon et al. (US Patent 6,265,153; July 2001). Perkins teaches a method of elongating DNA molecules in laminar flowing liquid as observed through fluorescence (Abstract).

With regard to claim 21, Perkins teaches a method of straightening and fixing polymeric molecules comprising the steps of:

(a) putting the polymeric molecules in a carrier liquid having first and second ends (Abstract, p. 83, col. 2, where the method is directed to stretching single, tethered DNA molecules in a uniform fluid flow; legend to Figure 1, see Figure 1, where the polymers have first and second ends),

(b) passing the polymeric molecules and carrier liquid through a micro-channel having a first wall to promote a laminar flow of carrier liquid in the micro-channel that straightens the polymeric molecule over the length until at least the first end of the molecule attach (legend to Figure 1, where fluorescently labeled DNA molecules were tethered at one end and were straightened in fluid flow; see also p. 86, col. 3, #26, where the coverslip and slide were separated to form a channel through which the DNA and the fluid flows).

With regard to claim 24, Perkins teaches an embodiment of claim 21 further including the step of (d) optically inspecting the straightened polymeric molecule attached to the first wall (Abstract, p. 83, col. 2, where the method is directed to stretching single, tethered DNA molecules in a uniform fluid flow; legend to Figure 1A, where the DNA was fluorescently labeled and images were taken; see also Figures 2A and 2B, for instance, where extension versus velocity were measured).

With regard to claim 25, Perkins teaches an embodiment of claim 21 further wherein step (b) first causes a straightening of the polymeric molecule in the laminar flow and third causes attachment of the length of the polymeric molecule to the wall (legend to Figure 1, where fluorescently labeled DNA molecules were tethered at one end and were straightened in fluid flow; see also p. 86, col. 3, #26, where the coverslip and slide were separated to form a channel through which the DNA and the fluid flows).

Regarding claims 21, 24 and 25, while Perkins does not teach that the polymeric molecule adheres electrostatically to the first wall of the channel, Bensimon teaches a process for aligning a macromolecule onto the surface of a support and attaching the molecule to the first wall (Abstract).

With regard to claim 21, Bensimon teaches a straightening and fixing polymeric molecules having first and second ends (Figures 1-5, for example, where the polymers have first and second ends), the method comprising the steps: having a first wall electrostatically attractive to the polymeric molecule (col. 3, lines 58-65, where the adsorption of the macromolecule onto the surface can be controlled through surface charges and the electrostatic interactions between the surface and the molecule; col. 4, lines 52-61, where specific types of surface functionalities

are described; see also col. 5, lines 4-23, for example) and straightens the polymeric molecule over its length until at least the first and second ends of the molecule attach to the first wall (Example 1, col. 17, lines 39-46, where capillary force on the DNA molecule(s) is sufficient to stretch the molecule; col. 4, lines 4-6, where it is noted that once aligned, the molecules adhere strongly to the surface).

With regard to claim 27, Bensimon teaches an embodiment of claim 21 further including the step of treating at least one wall of the microchannel to have a positive surface charge of predetermined density (col. 3, lines 58-65, where the adsorption of the macromolecule onto the surface can be controlled through surface charges and the electrostatic interactions between the surface and the molecule; col. 4, lines 52-61, where specific types of surface functionalities are described; see also col. 5, lines 4-23, for example).

With regard to claim 23, Bensimon teaches an embodiment of claim 21 further including the step of (d) applying restricting enzymes to the straightened polymeric molecule attached to the first wall (col. 12, lines 53-58, where physical mapping of genomic DNA can be carried out through a method comprising the steps of extraction, purification, cleavage with restriction enzyme followed by 'combing' on surfaces).

Regarding claim 23, Bensimon teaches that the method of physical mapping of polymeric molecules comprises thorough restriction digestion followed by fixation and elongation. However, it would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to modify the order of method steps taught by Bensimon to arrive at the claimed invention with a reasonable expectation of success. As noted in the MPEP § 2144.04 IV C, "Ex parte Rubin , 128 USPQ 440 (Bd. App. 1959) (Prior art reference disclosing a process of

making a laminated sheet wherein a base sheet is first coated with a metallic film and thereafter impregnated with a thermosetting material was held to render prima facie obvious claims directed to a process of making a laminated sheet by reversing the order of the prior art process steps.). See also In re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results); In re Gibson, 39 F.2d 975, 5 USPQ 230 (CCPA 1930) (Selection of any order of mixing ingredients is prima facie obvious.)." Therefore, in the absence of new or unexpected results, it would have been prima facie obvious to one of ordinary skill in the art to adjust the order of the method steps taught by Bensimon to arrive at the claimed invention with a reasonable expectation for success.

Further regarding claim 21, neither Perkins or Bensimon explicitly teach the term of "detaching" the first wall from the microchannel. Bensimon teaches analysis of the straightened polymeric molecules stretched out on a slide or other planar surface (Example 3, col. 19, lines 21-26, where the adhered molecules are analyzed after removal of the coverslip; see also Figures 7-9). Therefore, it would have been prima facie obvious to remove the slide or planar support with the straightened molecules attached for further processing, achieving the limitation of the claim as recited.

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to have applied the teachings of Bensimon to the method of DNA stretching and analysis taught by Perkins to arrive at the claimed invention with a reasonable expectation for success. Perkins teaches results "of the stretching of single, tethered DNA molecules in uniform fluid flow" and "we made our measurements by optically trapping a microsphere

attached to one end of a DNA molecule, while the other end remained free... to investigate the hydrodynamic interaction between the polymer and the fluid (p. 83, col. 2-3). While Perkins teaches attachment to the wall through a tether, Perkins does not teach that the polymer adheres to the wall. Bensimon teaches a very similar method of DNA analysis, however an end of the DNA is fixed and the DNA is aligned along the length of a wall, through progress of a meniscus instead of by laminar flow.

In view of the common teachings between Bensimon and Perkins, it would have been prima facie obvious to one of ordinary skill in the art to incorporate the format of a surface electrostatically attractive to a polymeric molecule to promote both adherence and straightening of polymeric molecules as taught by Bensimon into the format taught by Perkins. Furthermore, while it is noted that neither Bensimon or Perkins explicitly teach the term detachment of a wall or bead from within a channel, it was well known to one of ordinary skill in the art at the time the invention was made how to remove a bead or other type of surface, particularly with DNA attached, from a support, for further processing or analysis. Both Bensimon and Perkins teach the inclusion of glass coverslips (p. 579, col. 1). Bensimon specifically teaches "the combed YACs are denatured between two cover slips" and “the detection of hybrids is performed according to procedures known for in situ hybridizations” and “hybridized segments such as that shown in Fig. 10 are then observed by fluorescence microscopy” (Example 3, col. 19, lines 38-50). Therefore, despite the lack of specific teaching of the word detachment or detaching, it would have been prima facie obvious based upon the teaching of Bensimon of the desirability of having the stretched polymers or oligonucleotides present in a format available for further processing, analysis and detection, and therefore separate from the channel or means for

separation. It also would have been prima facie obvious to envision a channel for straightening molecules using techniques including Bensimon and Perkins, and to include a format wherein the stretched DNA could be removed for further analysis while stretched on the surface. Therefore, as each of these elements were known in the prior art at the time of the invention and the combination of these elements would provide a predictable result, it would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have incorporated these elements to analyze straightened DNA molecules and then to recover these molecules following analysis through the removal of the bead or wall element from the other portions of the channel or support.

2. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Perkins in view of Bensimon as applied to claims 21, 23-25 and 27 above, and further in view of Kaiser et al. (Journal of Molecular Biology, 1963, vol. 6, p. 141-7). Perkins teaches a method of elongating DNA molecules in laminar flowing liquid as observed through fluorescence (Abstract).

With regard to claim 26, Kaiser teaches an embodiment of claim 21 wherein the polymeric molecules are treated with a condensation agent to collapse the polymeric molecules into shear resistant balls and wherein step (a) includes the step of placing the polymeric molecules and carrier liquid into a reservoir attached to the micro-channel and decondensing the polymeric molecules in the reservoir prior to step (b) (Table 1, where specific concentrations of spermine are disclosed and p. 142, 'materials and methods' heading where DNA was isolated from bacteriophage λ and incorporated into the assay; p. 146, where it is noted that the protective effect may result from the formation of soluble aggregates).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to have included the teachings of Kaiser, regarding the protection of nucleic acids through the inclusion of spermine to the method of DNA stretching and analysis taught by Perkins and Bensimon to arrive at the claimed invention with a reasonable expectation for success. As taught by Kaiser, "Spermine markedly protects DNA from breakage by rapid stirring" (Abstract, line 1). Kaiser also teaches that "When λ DNA was stirred in the presence of spermine as shown in Table 1 neither the infectivity nor the ratio of turbid plaques to total plaques changed from their initial values." (p. 144, top paragraph). Finally, Kaiser concludes that "the data presented above show that polyamines, spermine in particular, protect λ DNA from breakage by rapid stirring" (p. 146, 'discussion' heading). The method taught by Perkins notes "direct visualization of the chain conformation gives us further insight into the deformation problem" and "because the chain is uniformly labeled with dye molecules and the imaging system has linear gain, the chain segment distribution may be inferred from intensity measurements from instantaneous images and time-averaged images (p. 86, col. 1, see also Figure 1A and Figure 4A). Considering these teachings, Perkins expresses motivation to maintain the polymer sequence in an intact linear format in order to facilitate the measurements regarding the length and flow rate analyses. Therefore, Perkins would have been motivated to incorporate solvents or steps directed specifically to the protection of the nucleic acid from breakage prior or during stretching. Considering the teachings of Kaiser towards the protective effects of spermine on DNA, one of ordinary skill in the art at the time the invention was made would have been motivated to incorporate spermine as taught by Kaiser into the method of DNA

stretching and analysis taught by Perkins and Bensimon to achieve intact molecules prior to and during stretching and analysis.

(10) Response to Argument

Applicant traverses the rejection of claims 21, 23-24 and 27 as being obvious over Perkins in view of Bensimon.

Applicant summarizes their position on page 4 of the brief and assert that the issues on appeal include whether the documents cited by the Examiner teach limitations including "micro-channel", "laminar flow", "attaching a molecule by at least its first and second end" and "detaching the first wall from the microchannel" (p. 4 of brief). Applicant argues that the documents cited in combination do not teach or suggest several claim limitations.

First, regarding the issue of a microchannel, Applicant argues "Perkins does not teach or suggest micro-channels" and that "The Examiner failed to identify any structure that allegedly constitutes a micro-channel". Applicant also argues "Perkins does not so much as mention using micro-channels" and that "using a micro-channel in combination with Perkins' method would be greatly impractical as Perkins teaches keeping the polymer away from any surface, a formidable task when the polymer is inside a micro-channel". Applicant concludes that the "Examiner did not explain how a sphere to which Perkins polymer is tethered could be used inside a microchannel" (p. 5 of brief). Regarding Bensimon, Applicant argues "Bensimon does not teach or suggest using micro-channels and, as such, cannot teach or suggest attaching the molecule to a first wall of the microchannel" (p. 5 of brief).

These arguments have been considered, but are not persuasive. First, it is noted that throughout Applicant's remarks and arguments, Applicant points to portions of the office action or to the same portions of the references as cited by Examiner and merely states or asserts that the reference does not teach the claimed feature. Citation to the same passage asserted by Examiner as teaching an element, and simply asserting that the same passage provides evidence of a teaching away, in the absence of an explanation amounts to a mere allegation of patentability.

Next, regarding the issue of a broad interpretation of the term microchannel and the manner in which two coverslips, or a coverslip and a microscope stage in the case of Perkins are interpreted as reading on a microchannel are discussed in the claim interpretation provided in prior office actions and reiterated above. Contrary to Applicant's assertion, a structure that constitutes a microchannel is taught by Perkins. As noted at footnote (26) of Perkins, in the legend to Figure 1 as cited in the office action, the flow is achieved on the polymer tethered/held between a coverslip and the microscope stage. Therefore, considering the lack of specific definition or claim limitations directed to particular dimensions, the "microchannel" formed between the cover slip and stage of Perkins, spaced roughly 75 uM apart meets a broadest reasonable interpretation of a microchannel as claimed. Furthermore, it is clear from this same teaching how a sphere of Perkins could be used inside a microchannel, as the sphere is tethered or held within the "channel' formed by the microscope slide and the cover slip. Therefore, Applicant's arguments are not persuasive.

Regarding the issue of laminar flow, Applicant argues "Perkins does not teach or suggest laminar flow" and that "Perkins' microspheres create turbulence" which is "inconsistent with laminar flow" and points to the legend to Figure 1B for support (p. 6 of brief). Applicant also argues "Bensimon teaches using capillary action/convection" and summarizes the teachings and concludes "Bensimon explicitly teaches away from using laminar flow, as explained below" (p. 6 of brief).

These arguments have been considered, but are not persuasive. While Applicant argues that Perkins does not teach laminar flow because of turbulence that is inconsistent with laminar flow, it is noted in response that Perkins clearly teaches that the tethered polymer is "stretched… in a uniform fluid flow", a description which meets the limitation of laminar flow. While the specific term laminar flow may not be used by Perkins, it is clear that the fluid flow exerts forces on the polymer in a "uniform" flow. Regarding Bensimon, it does not appear that Bensimon "expressly teaches away" from laminar flow. Instead, Bensimon is simply focused on a different embodiment, where the polymers are attached using fluid flow across a meniscus. It is not clear how the lack of specific teaching an element represents an express teaching away. Therefore, Applicant's arguments are not persuasive and the rejections are maintained.

Regarding the issue of attaching a first and second ends to the wall, Applicant summarizes the teachings of Perkins and argues "Perkins teaches attaching a DNA molecule to a microsphere at one end 'while the other end remains free'". Regarding Bensimon, Applicant argues "Bensimon does not teach or suggest using microchannels" and instead "teaches elongating polymeric molecules on coverslips, not on the walls of micro-channels". Applicant

concludes that Bensimon cannot teach attaching the molecule to the first wall of a microchannel "because Bensimon does not teach micro-channels in the first place" (p. 6 of brief). Finally, Applicant argues that "Bensimon also does not teach using laminar flow to attach the molecule", that Bensimon "teaches away from using laminar flow" and "Bensimon's molecules are attached to a surface before they are contacted by a liquid" (p. 7 of brief).

These arguments have been considered, but are not persuasive. While Applicant is correct that Perkins does not teach adhering the molecule to the microscope slide or to the microscope stage, the teaching of Perkins is not a teaching away from adherence of at least one end of the polymer. Perkins specifically teaches tethering one end of the polymer, followed by straightening or stretching the free end. Considering the methods of both Perkins and Bensimon share a common first step where the polymer is tethered at one end to a support, and considering Perkins discussion of a variety of different models for the stretching of polymers in a variety of formats, it is not unreasonable to consider that Perkins could analyze or envision study of the behavior of the polymer as it extends and stretches along a surface. Therefore, while Applicant's arguments are noted, they are not persuasive regarding a clear teaching away from attachment of at least one end to a surface.

Regarding Bensimon, again it is noted that it does not appear that Bensimon "expressly teaches away" from laminar flow. Instead, Bensimon is simply focused on a different embodiment, where the polymers are attached using fluid flow across a meniscus. It is not clear how the lack of specific teaching of an element represents an express teaching away. Regarding Applicant's argument that Bensimon only teaches attachment of one end of the polymer while the other end is free in solution, it is first noted that this is a feature shared between Perkins and

Bensimon. It is also noted that this is the format for the polymer at the start of the method, the final step results in and requires adherence of both ends of the polymer. As Bensimon states, the passage of the meniscus "leaving them adsorbed on the surface behind the meniscus" (col. 1), indicating that the entire polymer, including both ends, are adsorbed, or attached, to the wall/cover slip.

Regarding the issue of detaching the wall of the microchannel, Applicant argues "Bensimon does not teach micro-channels, much less removing a wall therefrom". Applicant also argues that the passage relied upon by the Examiner "merely teaches dipping cover slips into a DNA-agarose solution and subsequently removing the coverslips at 170 um/sec to align the YAC molecules". Applicant concludes that "even if two cover slops were equivalent to a micro-channel... Bensimon does not teach removing one from the other because individual cover slips are used" (p. 7 of remarks). Applicant finally asserts that the step of detaching the wall was not obvious because neither Perkins nor Bensimon teach a micro-channel and therefore cannot suggest removing a wall of the microchannel (p. 9 of remarks). Further, Applicant argues that Kaiser does not remedy the deficiencies in Perkins and Bensimon.

These arguments have been considered, but are not persuasive. Applicant's arguments regarding the apparent teaching away from alignment between two cover slips, see for instance, the passage that states "in order to limit the problems associated with too slow reaction times, the diffusion times of the reagents towards the surface can be advantageously reduced using small reaction volumes…by carrying out the reaction in a volume of a few microliters determined by the space between two surfaces" (col. 11, lines 31-40). Bensimon also notes "In a specific

embodiment, the solvent is placed between two supports of which at least one corresponds to the said support of surface S and the meniscus is moved for example by evaporation" (col. 2, lines 64-67). Bensimon also teaches that a drop of DNA is "deposited on a pre-treated glass coverslip (C=C) and covered with an untreated glass coverslip" (col. 17), which is then followed by detection. Therefore, Bensimon clearly teaches a format which meets the broadest reasonable interpretation of the term micro-channel and includes alignment between two cover slips. Furthermore, as noted in the obviousness rejection, it would have been obvious to one of ordinary skill to remove the coverslip used by either Bensimon or Perkins for further analysis of the stretched molecules attached to the coverslip (or wall), which would result in detachment of a wall (or coverslip). While Applicant's argument that Bensimon "merely teaches dipping cover slips into a DNA-agarose solution" is noted, and Applicant argues that the support is sealed by rubber cement and therefore precludes the removal of a wall, a careful reading of the passage indicates that during the process of alignment, denaturation and hybridization, the coverslip covering the aligned polymers is necessarily removed before the hybridization step. Therefore removal of the coverslips is equivalent to "detaching a wall" as argued above and Applicant's arguments are not persuasive and the rejections are maintained.

Applicant also traverses the rejection of claim 26 as being obvious over Perkins in view of Bensimon and further in view of Kaiser. Applicant states briefly that "Kaiser does not make up for the shortcomings of Perkins and Bensimon as it contemplates neither laminar flow nor micro-channels (p. 9 of brief).

These arguments have been considered but are not persuasive for the same reasons as argued above over Perkins and Bensimon and the rejection is maintained.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Stephanie K. Mummert/
Primary Examiner, Art Unit 1637

Conferees:

/GARY BENZION/
Supervisory Patent Examiner, Art Unit 1637

/Peter Paras/
SPE, Art Unit 1632